

Amendments to the Claims

The listing of claims will replace all prior versions, and listings of claims in the application.

1. (currently amended) A method₁ comprising a multistep process for recovering one or more monosaccharides from a feed solution containing rhamnose and at least ~~two~~ one ~~monosaccharides~~ monosaccharide selected from the group consisting of ~~rhamnose~~, arabinose, xylose and mixtures thereof by using chromatographic separation comprising at least one step, where a weak acid cation exchange resin is used for ~~the~~ said chromatographic separation so as to obtain a rhamnose rich fraction and recover rhamnose from the feed solution.

2. (currently amended) The method of claim 1₁ comprising feeding the feed solution to a chromatographic column containing a weak acid cation exchange resin, eluting said chromatographic column with an eluant, and separating and recovering [[a]] the rhamnose rich fraction

3. (currently amended) The method of claim 1₁ wherein a strong acid cation exchange resin is further used for the chromatographic separation.

4. (currently amended) The method of claim 1₁ wherein the multistep process further comprises steps selected from the group consisting of crystallization, filtration, evaporation, precipitation and ion exchange.

5. (canceled)

6. (currently amended) The method of claim [[5]] 1₁ wherein the rhamnose

recovered is L-rhamnose.

7. (currently amended) The method of claim [[5]] 1, wherein the feed solution is a xylose process stream or side stream.

8. (currently amended) The method of claim [[5]] 1, wherein an arabinose rich fraction is further separated and recovered from the feed solution.

9. (currently amended) The method of claim 8, wherein the arabinose to be recovered is L-arabinose.

10. (currently amended) The method of claim [[5]] 1, wherein a xylose rich fraction is further separated and recovered from the feed solution.

11. (currently amended) The method of claim 10, wherein the xylose to be recovered is D-xylose.

12. (currently amended) The method of claim 1, wherein the weak acid cation exchange resin is an acrylic resin.

13. (currently amended) The method of claim 12, wherein the acrylic resin is derived from the group consisting of methyl acrylate, ethyl acrylate, butyl acrylate, methyl methacrylate, acrylonitrile, acrylic acids and mixtures thereof.

14. (currently amended) The method of claim 12, wherein the cation of said weak acid cation exchange resin is in the form selected from the group consisting of Na⁺, Mg²⁺, H⁺ and Ca²⁺.

15. (currently amended) The method of claim 14, wherein the cation of said weak acid cation exchange resin is in Na⁺ form.

16. (currently amended) The method of claim 12, wherein the resin is crosslinked with divinyl benzene (DVB).

17. (currently amended) The method of claim 16, wherein the crosslinking degree of the resin is 3 to 8 % by weight.

18. (currently amended) The method of claim 2, wherein the eluant is water.

19. (currently amended) The method of claim 1, comprising feeding the feed solution to a first chromatographic column and then feeding a fraction of the outcoming solution from the first chromatographic column to a second chromatographic column, both columns containing a weak acid cation exchange resin.

20. (currently amended) The method of claim 19, comprising feeding a fraction of the outcoming solution from the second chromatographic column to a third chromatographic column containing a strong acid cation exchange resin and feeding a fraction of the outcoming solution from the third chromatographic column to a fourth chromatographic column containing strong acid cation exchange resin.

21. (currently amended) The method of claim 1, comprising feeding the feed solution to a first chromatographic column containing a strong acid cation exchange resin and then feeding a fraction of the outcoming solution from the first chromatographic column to a second chromatographic column containing a weak acid

cation exchange resin.

22. (currently amended) The method of claim 21, comprising feeding a fraction of the outcoming solution from the second chromatographic column to a third chromatographic column containing a weak acid cation exchange resin.

23. (currently amended) The method of claim 19, comprising feeding a fraction of the outcoming solution from the second chromatographic column to a third chromatographic column containing a strong acid cation exchange resin.

24. (currently amended) The method of claim 21, comprising feeding a fraction of the outcoming solution from the second chromatographic column to a third chromatographic column containing a strong acid cation exchange resin.

25. (currently amended) The method of claim 19, wherein prior to feeding the fraction of the outcoming solution to the next chromatographic column said fraction is concentrated by evaporation.

26. (currently amended) The method of claim 21, wherein prior to feeding the fraction of the outcoming solution to the next chromatographic column said fraction is concentrated by evaporation.

27. (currently amended) The method of claim 2, wherein the temperature of the eluant is ~~between~~ from 10 °C ~~and to~~ 95 °C.

28. (currently amended) The method of claim 27, wherein the temperature of the eluant is ~~between~~ from 55 °C ~~and to~~ 85 °C.

29. (currently amended) The method of claim 1, wherein the particle size of the weak acid cation exchange resin is 10 to 2000 µm.

30. (currently amended) The method of claim 29, wherein the particle size of the weak acid cation exchange resin is 100 to 400 µm.

31. (currently amended) The method of claim 1, wherein the pH of a feed solution is 1 to 10.

32. (currently amended) The method of claim 31, wherein the pH of the feed solution is 2 to 4.

33. (currently amended) The method of claim 31, wherein the pH of the feed solution is 5 to 10.

34. (currently amended) The method of claim 19, comprising recovering xylose and arabinose from both the first and the second chromatographic column.

35. (currently amended) The method of claim 21, comprising recovering xylose and arabinose from both the first and the second chromatographic column.

36. (currently amended) The method of claim 8, comprising isolating arabinose of the arabinose rich fraction by crystallization.

37. (currently amended) The method of claim 20, comprising recovering rhamnose from the second and/or the third chromatographic column.

38. (currently amended) The method of claim 22, comprising recovering rhamnose from the second and/or the third chromatographic column.

39. (currently amended) The method of claim 6, comprising further isolating L-rhamnose by crystallization.

40. (currently amended) The method of claim 6, comprising isolating L-rhamnose in the form of monohydrate.

41. (currently amended) The method of claim 10, comprising isolating xylose of the xylose rich fraction by crystallization.

42. (currently amended) The method of claim 1, wherein the method is a batch process.

43. (currently amended) The method of claim 1, wherein ~~the feed solution includes rhamnose and a~~ the rhamnose fraction is collected before the other monosaccharides.

44. (currently amended) The method of claim 1, wherein ~~the feed solution includes rhamnose and a~~ the rhamnose fraction is collected after the other monosaccharides.

45. (currently amended) The method of claim 1, wherein the feed solution includes rhamnose and arabinose and both are collected together.

46. (currently amended) The method of claim 1, wherein the chromatographic separation method is a simulated moving bed system.

47. (currently amended) The method of claim 46, wherein the simulated moving bed system is sequential.

48. (currently amended) The method of claim 46, wherein the simulated moving bed system is continuous.

49. (currently amended) The method of claim 46, wherein at least one column or a part of a column contains a strong acid cation exchange resin and at least one column contains a weak acid cation exchange resin.